Case Report

A challenging case of total hip arthroplasty in a hemodialysis patient having avascular necrosis of femoral head

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ABSTRACT

Avascular necrosis (AVN) is an uncommon complication of hemodialysis. Total hip arthroplasty (THA) is the chosen treatment modality in patients suffering from late-stage AVN of the femur; however, performing THA in a hemodialysis patient is challenging. This article describes a case of bilateral late stage AVN of the femoral head in a patient with a failed renal transplant, currently on hemodialysis. To the best of our knowledge, this is the first report of THA in such a patient. A 46-year-old female patient presented with complaints of pain in the hip joint radiating to the groin and anterolateral aspect of the thigh. She was bedridden and suffering from renal failure at the time of presentation and was undergoing hemodialysis for the same. Her history revealed a failed renal transplant. The diagnosis was done with the help of radiographs and magnetic resonance imaging scan which showed bilateral AVN of femur. We conducted THA for both the hip joints at an interval of 6 months. The patient recovered in an uneventful manner and at the time of discharge, the patient could walk without a walker.

Key words: *Avascular necrosis, Hip arthroplasty, Renal failure, Renal transplant*

Avascular necrosis (AVN) is commonly observed in those patients who have undergone renal transplant [1]. The factors which are responsible for it include the use of systemic steroids [2] and hemodialysis [3]. Total hip arthoplasty (THA) is a promising approach for providing mobility in patients suffering from later stages of AVN of the femoral head (AVNFH) [4]. However, in patients who are on hemodialysis THA is associated with hemorrhage, infection, mortality, revision, aseptic loosening, and hip dislocation [5]. The factors which make them particularly prone to infection include immunosuppression, the presence of chronic systemic illness and presence of inert material such as prostheses which facilitates microbial growth [6]. A study was conducted by Reategui D among 114 hip arthroplasty patients, which reported a high rate of revision in the dialysis group due to periprosthetic fractures [7]. Similarly, Debarge *et al*. reported about 28 renal failure patients (37 hips) having undergone THA [8]. The patients suffered from a high incidence of early post-operative complications such as deep vein thrombosis, pulmonary embolism, operative site hematoma, and sepsis. Therefore, the potential complications of this procedure pose a significant challenge to the operating surgeon.

Very few studies have been conducted evaluating the place of THA in either renal transplant or hemodialysis recipients. To the best of the author's knowledge, this is the first case in which THA has been successfully conducted in a patient having a failed renal transplant currently undergoing hemodialysis.

CASE REPORT

A 46-year-old female patient presented at a multispecialty hospital in June 2017 with a chief complaint of pain in both the hip joints since January 2016. She had a history of renal transplant in 2005. In 2015, the allograft rejection occurred. The patient was then recommended dialysis on every alternate day. In 2016, the patient started suffering from intermittent pain in the hip joint of increasing severity which was radiating to the groin and anteromedial aspect of the thigh. She also experienced joint stiffness and started walking with a limp. Her mobility gradually decreased, and she became bedridden in January 2017. The patient visited several hospitals for the same complaint, but due to her medical history and a high chance of contracting infection, only supportive treatment was given. Then, the patient reported to our hospital, and after understanding about all possible treatment options, the patient was advised for total hip replacement procedure.

On examination, the patient was stable. She had tender anterior hip point (bilateral), restriction in range of movement in both the hip joints and pain during passive movement. The other lower limb joints were normal. She was also suffering from a discharging sinus on her left thigh due to thigh abscess.

Radiographs and magnetic resonance imaging scan revealed bilateral AVNFH (Figs. 1 and 2). The requisite blood investigations were performed and found normal. C-reactive protein (CRP) levels were observed to be 13.8 mg/L (normal range 1–3 mg/L).

Sinus tract excision was performed by a general surgeon. Following surgery, the CRP came to normal. The orthopedic surgeon then started her on antibiotics for resolving the existing infection. The operation was done in November 2017 (Fig. 2), June 2018 (for the other joint) (Fig. 3) and successfully conducted the total hip replacement procedure. There was no ongoing infection at the time of surgery. The uncemented total hip replacement was performed. A posterolateral approach was taken, and the size of the incision was 4 inches. Acetabulum was done first, and number 47 uncemented cup pinnacles were used. Number 32 ceramic head and 10 sizes femoral uncemented Corail stem were used. The head was removed on the left side in stage 2/3 osteonecrosis, and the right side head was removed in stage 2Q osteonecrosis. The drain was inserted and kept for 36 h.

On the 4th day follow-up, wound inspections were within normal limits, and no oozing was observed. The stitches were removed on the 14. The wound appearance was healthy with healing on primary intention. The patient could stand on the 2nd post-operative day and started walking with the help of a walker on the 4th post-operative day. On day 7, the patient could walk using crutches, and on the day 14, she could walk without using crutches. The patient did not complain of any pain on day 14. Harris hip score was 10 preoperatively and 40 post-operative on day 15. The range of movement on the 15th post-operative day was abduction 40°, adduction 20°, flexion 90° active, and 100° passive, extension 10° (Figs. 4 and 5).

Figure 1: Anteroposterior radiograph revealing bilateral avascular necrosis of the femoral head

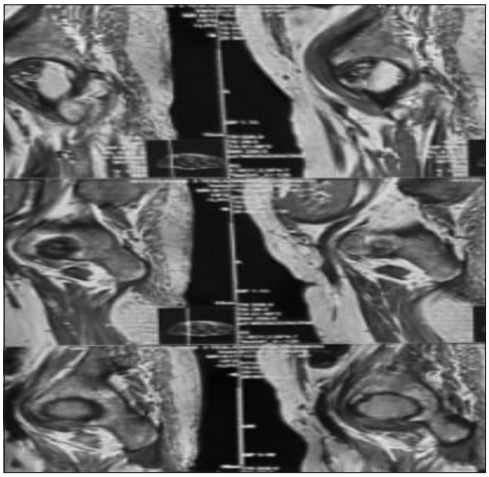

Figure 2: Pre-operative magnetic resonance imaging scan of right thigh and hip to depict the status of abscess and sinus

DISCUSSION

In the present case, the patient presented with late-stage bilateral AVNFH. At the time of presentation, she was undergoing alternate day dialysis after the failure of her renal transplant. The patient was then suggested for bilateral THA taking into consideration the morbidity, immobility and poor quality of life that the patient would have had to endure otherwise. Since the patient is middle-aged, she has a good life expectancy and is not suffering from any other comorbidity apart from the renal disease. Moreover, the necessary aseptic precautions such as the resolution of existing infection before surgery by appropriate use of antibiotics were taken.

Similar to our case, Li *et al.* [9] reviewed the outcome of 23 uncemented THAs undertaken between 1993 and 2004 in patients with chronic renal failure who had been on long-term hemodialysis (2–18 years). They reported substantial improvement in post-operative pain relief and joint motion after THA. At the final follow-up, 11 patients walked normally without a limp or support, 6 patients could walk for 6 blocks with a cane, and 3 patients were limited to indoor activities with a walker. Sakalkale *et al.* [10] studied the outcomes of 12 patients on long-term dialysis who

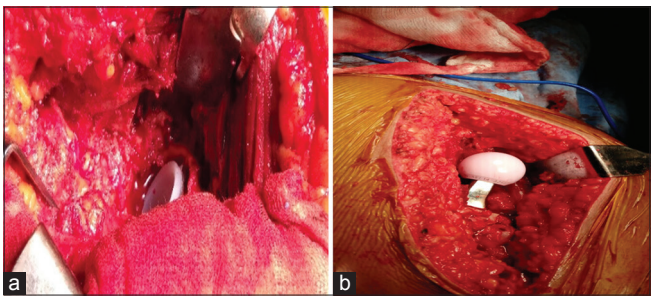

Figure 3: (a and b) Intraoperative images

Figure 4: Anteroposterior view of the left hip after hip replacement surgery at 3 months follow-up

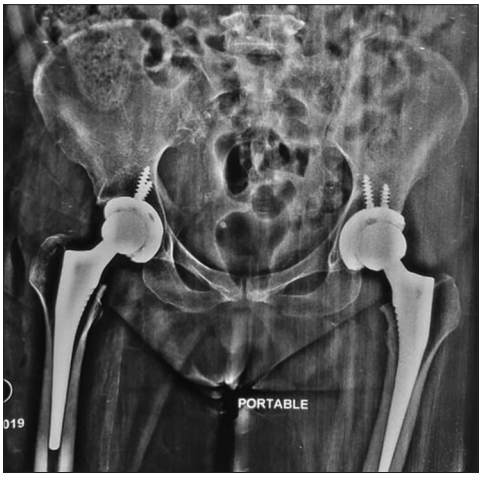

Figure 5: Anteroposterior view of the right hip after hip replacement surgery at 1 year follow-up

had undergone 15 implant surgeries. There was high mortality (58%) and high overall early complication rate (58%) with a deep infection rate of 13%. Of patients, 76% (n=11) had a good clinicoradiologic outcome of the THA before their death or at their latest follow-up. They concluded that THA in patients on dialysis should be reserved for those with a better life expectancy.

Toomey and Toomey [11] retrospectively evaluated 15 patients on chronic renal dialysis (24 hips) who had undergone THA between 1970 and 1990. The average follow-up was 8 years (range, 1–19 years). They reported that a complicated course was experienced in 16 hips (66%). A high incidence of complications such as failed implants and low survival was observed. The authors reported that despite the high complication rates, 22/24 primary hips were relieved of pain and increased in function and six patients returned to work. The authors concluded that there no better alternative for pain relief in dialysis patients than THA.

CONCLUSION

Careful patient selection is of vital importance when chronic renal failure patients are considered for THA, with special reference to an ongoing infection. The surgeon must consider factors such as age, comorbidities, quality of life, and morbidity before deciding on the treatment approach. The benefits of the procedure must be weighed against the complications, and the patient must be involved in decision-making.

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